been appointed representatives of the University for the organisation of a Congress on Tuberculosis to be held in London in 1901.

AT the annual prize distribution of the Merchant Venturers' Technical College, Bristol, on December 20, an address will be given by Sir W. H. White, K.C.B., F.R.S., Director of Naval Construction to the Admiralty.

WE learn from the *British Journal of Photography* (December 1) that Dr. Hans Harting, formerly of Messrs. Zeiss, of Jena, has joined the Board of Management of Messrs. Voigtlander and Sohn. He succeeds Dr. Miethe, who was recently appointed Professor of Chemistry and Spectrum Analysis at the Technical High School, Berlin.

THE annual prize distribution and conversazione of the Northampton Institute, Clerkenwell, will be held to-morrow evening, December 8. Sir Henry Roscoe will distribute the prizes. A comprehensive programme of exhibits and short lectures referring to the various sides of the Institute's work has been prepared. Dr. Walmsley will describe alternating currents; Mr. John Ashford, flying machines in fiction and fact; and Mr. A. W. Martin, high speed telegraphy. There will also be special demonstrations of liquefaction of air, alternate currents, ice-making, mortising by machinery, colour photography, rapid stereotyping, and other subjects.

THE *Pioneer Mail* announces that the Government of India have given their cordial approval to the Tata scheme for an India University of Research, recently formulated by a conference at Simla, and already referred to in these columns. As soon as all the details have been worked out, the necessary legislation for the incorporation of the new University will be undertaken. Meanwhile the Government of India commend the scheme to the liberality of the public, and wish it every success, while they acknowledge in the most cordial manner the public spirit shown in Mr. Tata's munificent endowment. The Government of Bombay will be asked to appoint an officer to arrange with Mr. Tata for the transfer of the property which is to constitute the endowment.

THE Calendars of University College, London, and the University College of Sheffield, for the session 1899-1900, have been received. In the former, the Dean of the Faculty of Science, Prof. T. Hudson Beare, refers to the part taken by the College in connection with the reorganisation of the University of London, and expresses pleasure that in the new University engineering is to be put on an equal with the sister professions, law and medicine, and that (if the draft statutes are adopted) it is to have its own Faculty and its own representatives on the Academic Council. A noteworthy addition to the Dean's report is a complete list, covering nine pages, of the original memoirs and writings which have emanated from the different scientific departments of the College during the past two years. In the Calendar of the University College of Sheffield it is announced that a bacteriological laboratory has been established, with a special demonstrator to devote the whole of his time to bacteriological investigations.

SOME interesting particulars with reference to the relative attention given to science in our secondary schools, as judged by the number of candidates who present themselves in scientific subjects in the public examinations usually taken by the pupils, is given in the December number of *The School World*. It appears that in January of this year, of 1250 candidates examined for matriculation in London University, 842 selected a language as their optional subject, and 408 a branch of science. The total number of candidates who were examined in the five optional science subjects was little more than half the number that selected French as the optional subject. At the last Oxford Senior Local Examinations, the number of papers worked in English subjects was 6977, in languages 2418, in science subjects 796; in addition to which 969 candidates took mathematics. In the Senior Cambridge Local Examinations in 1898, the number of papers in English subjects was 10,327, in languages 3391, in mathematics 1590, and in science 1838. Similar proportions are shown to exist among candidates who present themselves for other general examinations. The numbers show clearly that in most of our secondary schools science still occupies but a minor place in the curricula.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Microscopical Society, November 15.—Mr. E. M. Nelson, the President, in the chair.—Mr. C. L. Curties exhibited a new form of portable microscope by Leitz. It had a folding foot and a movable stage, to enable the instrument to be packed in a small compass. The body was not made to incline, but was furnished with coarse and fine adjustment, and the stage was fitted with a modified form of Abbé condenser, with iris diaphragm. The President thought the instrument would be useful to those requiring a very portable one; its great compactness was effected in an ingenious manner, while the working parts were well made and finished.—The President read a short note descriptive of a set of three simple hand microscopes on the Coddington principle sent for exhibition by Mr. Edward Swan. They were apparently made for a medical man, and could not be very old. Dr. Hebb said Prof. Groves had made some modification in the form of a hand microtome, and had sent it for exhibition. The President called attention to six photomicrographs of the larvæ of gnats, taken from life by Mr. J. T. Holder. The President exhibited an old Gillett condenser, dated July 20, 1849, which had a collar adjustment.—Dr. H. C. Sorby's paper on the preparation of marine worms as microscopical objects was read by the President in the unavoidable absence of the author. The subject was illustrated by beautifully mounted slides under microscopes.—The attention of the meeting was then directed to a fine exhibition of *Foraminifera* by Mr. A. Earland, shown under a large number of microscopes, with written descriptions explaining the points of interest in each slide.

Linnean Society, November 16.—Mr. G. R. Murray, F.R.S., in the chair.—Mr. J. E. Harting communicated particulars of several cases in which parrots had been poisoned by eating parsley. After commenting on instances in which plants that were innocuous to man had proved fatal to some of the lower animals, he mentioned in support of the converse case that the berries of the yew and privet, which are generally considered to be poisonous to man, were greedily eaten by blackbirds, thrushes, bullfinches, and other birds; while, on the other hand, several cases were on record of pheasants having been poisoned by eating yew leaves. The immunity of goats from yew poisoning was remarkable in view of the fact that deer and cattle died after eating the leaves of that tree, although it had been stated that the ill effects were due to the leaves having been eaten in a desiccated state, and not while growing on the tree.—Mr. W. C. Worsdell read a paper on the comparative anatomy of certain species of *Encephalartos*. The chief features of the anatomy were shown to be the presence of several vascular cylinders in the stem, a character found also in *Cycas* and *Macrozamia*; and the *medullary* system of vascular bundles, forming, as in *Macrozamia Fraseri*, Miq., a complex network, intimately united with a corresponding network of mucilage-canals. The system of mucilage-canals in the pith is continuous with that of the cortex, but the medullary bundles form an independent *primary* system. The mucilage-canal-system is probably of use as a storehouse of moisture during the dry season, when the roots and foliage die away.—Mr. W. T. Calman read a paper on a collection of *Brachyura* from Torres Straits. These Crustacea had been collected by Prof. Haddon on his first expedition to Torres Straits in 1888. It comprised about seventy-five species, three of which were described as new, namely, *Cryptocnemus Haddoni*, *Pilumnus cristipes*, and *Lambrus confragosus*. Among the species already known, concerning which some fresh details were given, was the minute parasitic *Hapalocarcinus marsupialis*. Although described forty years ago by Stimpson, it had escaped re-examination until now, notwithstanding that the curious gall-like growths to which it gives rise on corals are well known. The occurrence in this collection of the three known Indo-Pacific species of *Palicus* (*Cymopolia*), two of which have been recorded hitherto only from widely distant localities, afforded the author of this paper an opportunity for a detailed examination of their distinctive characters.

Geological Society, November 22.—W. Whitaker, F.R.S., President, in the chair.—On some remarkable calcisponges from the Eocene Tertiary Strata of Victoria (Australia), by Dr. George Jennings Hinde, F.R.S. The greater number of the sponges described were discovered by Mr. T. S. Hall, of Melbourne

University, in incoherent detrital beds of Eocene age, in the southern part of Victoria; a few were picked out of some washings of fragmental polyzoa from the same district and horizon, by Mr. B. W. Priest. Some of the specimens are in an extremely perfect condition, and their structural details are as distinctly shown as in recent sponges. They are also of more than local interest in that they are the first fossil forms described of a group of calcisponges, the Lithonina, characterized by the peculiar aberrant forms of some of the spicules, and the mode in which they are closely fitted and organically fused together to form the skeletal mesh. This structure has, so far, only been recognised in one recent species, *Petrostroma Schulzei*, Döderlein, from the Japanese sea. The sponges are small, unattached, with a glassy, firm resistant skeleton, calling to mind that of siliceous Lithistida. They are built up of a great variety of spicular forms, some are simple rods, with three and four-rayed spicules, similar to those in recent calcisponges; but the majority are aberrant four-rayed forms, with three of the rays curved and with obtuse or expanded ends which are clasped, and fused as well, to the surfaces of adjacent spicules. The connected spicules form continuous anastomosing or radial fibres resembling those in the fossil Pharetrones, to which they are in some other respects similar, and it is probable that the spicules in the fibres of some members of this family were likewise organically cemented together. The common *Porosphæræ* from the Upper Chalk, generally regarded as Hydrocorallines allied to the recent *Millepora*, are also closely related to the above sponges, and the author hopes shortly to publish the evidence for their affinity to this group. The Victorian sponges are placed in four new species, belonging to three genera: two of these are new, the other, *Bactronella*, Hinde, was founded on some peculiar calcisponges of Jurassic Age, now known to be Lithonine in character.—In the discussion which followed, Prof. Sollas referred to the importance of these sponges from an evolutionary point of view.—The Silurian Sequence of Rhayader, by Herbert Lapworth. The stratigraphical relations of the Silurian formations which occur in the country surrounding the town of Rhayader (Radnorshire) were described in detail. Typical and confirmatory sections were given, demonstrating the complete local sequence of the rocks of the Rhayader district. These were illustrated by lists of characteristic graptolites. These fossils were compared with those of Southern Scotland, Sweden, and North Wales, showing that the graptolite succession is everywhere similar, and fixing the age of the Rhayader series as representing the Lower Llandovery, Upper Llandovery, and Tarannon of other areas. Finally, several new species of *Climacograptus* and *Diplograptus* were described. Tables of fossils enabled the author to establish a complete comparison of the whole of the local zones of the Rhayader district with those of Southern Scotland, Wales, and Sweden. In the Rhayader area there is found, for the first time in Britain, the entire Valentian succession developed in one general sequence of rocks, with a more or less common lithological character and with a fauna composed throughout of similar palæontological types.

MANCHESTER.

Literary and Philosophical Society, November 28.—Prof. Horace Lamb, F.R.S., President, in the chair.—Prof. F. E. Weiss exhibited some specimens of *Melanospora parasitica* found by Mr. H. Murray at Flixton. This species is now known to be parasitic on another fungus, *Isaria farinosa*, which infests the larvæ and pupæ of various insects. The latter fungus (*Isaria*) is now recognised as being another stage of growth of *Cordiceps militaris*, which has been particularly common this autumn.—Report on the Marine Mollusca obtained during the Jackson-Harmsworth Expedition to Franz Josef Land 1896–97, by J. Cosmo Melvill and Robert Standen. The collection was formed by Mr. W. S. Bruce, naturalist to the expedition, mainly at Franz Josef Land, and at Kolguev, the results from the first-named locality being by far the most voluminous both in quantity and quality, and forming an important contribution to science as being the most northerly dredgings of Mollusca yet obtained in the Polar regions. Only one species—a *Buccinum* (*B. Brucei*) of peculiar form—is considered new to science, but a *Thracia*, of which only very imperfect valves were obtained, is also probably so; whilst a *Sipho* (*S. togatus*) is particularly interesting on account of its peculiar epidermis. Considering how fully the Arctic mollusca have been studied, especially during the past thirty years, the results of this expedition are very gratifying. The total number catalogued are Kolguev, 36; Franz Josef Land, 66. Naturally, the nearer the poles are attained, life—pelagic as well as terrestrial—is adversely affected; for instance, the total number of northern mollusca round the Norwegian coasts is, according to Sars, 460 species.

DUBLIN.

Royal Irish Academy, November 30.—The Lord Bishop of Canea, Vice-President, in the chair.—Mr. Trouton showed an apparatus with which he had determined the heat required to evaporate steam from saturated salt solutions. The plan adopted consisted of an inner vessel completely surrounded by a larger one. The same solution is placed in both. The outer one is kept boiling by the application of external heat; the inner by an electric heater. The steam from the inner vessel is collected and weighed. In this way by knowing the heat supplied electrically the latent heat is found. Determinations made with various salts were described. The connection was also considered between the latent heat of evaporation from salt solutions and the cooling which accompanies the solution of the salt in water. In addition an apparatus was shown by means of which the cooling can be observed, through bringing the salt and water together at a temperature higher than the boiling point. This consisted of two spherical vessels placed over each other and connected by a tube which passed through the upper to near the bottom of the lower one. By means of a stopcock connection is closed till required. The water is placed in the lower, the salt in the proper proportions in the upper one. The whole is heated in a thermostate to such a temperature that on mixing, the resultant solution falls to the boiling point. In the case of sodium nitrate this cooling was 40° C.

PARIS.

Academy of Sciences, November 27.—M. van Tieghem in the chair.—The Perpetual Secretary gave an account of the present state of the fund for the Lavoisier monument.—The propagation of a pencil of parallel light, limited laterally, in a heterogeneous transparent medium; integration of the equations of motion, by M. J. Boussinesq.—Experiments on the destruction of Phylloxera, by M. Lanfrey. An aqueous 1 per cent. solution of picric acid is applied during June, July or August. The same treatment may be advantageously applied to other fruit trees.—Observations on the Leonids made in 1899 at the Observatory of Lyons, by M. J. Guillaume. Fog prevented observation on the nights of November 14 and 15, but on November 12, 13 and 16, only twenty-six Leonids were noted.—Observations of the Leonids made at the Observatory of Algiers, by M. Ch. Trépied. The numbers observed were, on November 13, three; on the 14th, thirty-six; the 15th, thirty. Forty per cent. of the shooting stars observed did not belong to the Leonid swarm. The classification of the Leonids in order of magnitude showed that 10 were of the 1st magnitude, 22 of the 2nd, 19 of the 3rd, 9 of the 4th, and 6 of the 5th.—Observations of the Leonids at Algiers, by M. Harold Tarry. During the three nights 92 shooting stars were counted.—On the definition of the area of a surface, by M. H. Lebesgue.—On the number of roots of an algebraical equation comprised in the interior of a given circumference, by M. Michel Petrovitch.—On the generalisation of Lagrange's development in continued fraction of the function $(1 \times x)^m$, by M. H. Pade.—On the stability of equilibrium of floating bodies and particularly of a ship carrying a liquid cargo, by M. P. Duhem. Referring to a recent note of M. P. Appell on this subject, in which a paper by the author is quoted, it is here pointed out that this work was completed in a second paper, with results agreeing with those recently published by M. Appell.—Remark on the preceding communication, by M. Appell.—On the transmission of sound by electricity, by M. Dussand. A description of a microphone by which the spoken sounds can be transmitted with very slight loss of intensity.—On the chemical action of the X-rays, by M. P. Villard. The X-rays, freed from kathode rays by an aluminium screen, cause a violet coloration of the glass, apparently due to an oxidising action.—The action of dry hydrochloric acid upon silver and the reverse reaction, by M. Jouniaux. The interaction of hydrogen and silver chloride in sealed tubes was studied at various temperatures—350°, 440°, and 600°. A limiting value for the percentage of hydrochloric acid formed was found in each case, but the velocity with which this limit was attained differed greatly with the temperature, requiring several months at 250°, five weeks at 350°, seventy hours at 440°, and only one hour at 600°. Starting with the system silver, hydrochloric acid, a limit was similarly obtained for each temperature; but the final state of equilibrium was not the same as in the first case for temperatures below 600°. It is an example of the false equilibrium of M. Duhem.—On camphenylone, by MM. E. E. Blaise and G. Blanc. Camphene is treated with nitrogen peroxide at 0°, and the nitrate converted into camphenylone by treatment with potash. This ketone is treated with hydroxylamine, and the oxime dehydrated with acetyl chloride. The nitrite thus obtained gives on reduction a base, which is not identical with dihydroaminocampholene or the aminocampholenes. Hence camphenylone and its derivatives do not contain the trimethylcyclopentanic ring which exists in bodies belonging to the camphor series.—The colouring matter of digitalis, by MM. Adrian and A. Trillat. The new substance forms yellow needles, and has the composition $C_{16}H_{12}O_4$. It is very stable towards chemical reagents.—On an experiment relating to submarine currents, by M. J. Thoulet.—The resistance of seeds to high temperatures, by M. Victor Jodin. If seeds are gradually dried they will resist a temperature of 100°. Thus some seeds heated directly to 98° for ten hours were all killed; but if heated for twenty-four hours at 60° and then ten hours at 98°, from 30 to 60 per cent. of the seeds germinated.—On the glacial period in the Central Carpathians, by M. E. de Martonne. A detailed topographical study confirmed the views of Lehmann, showing undoubted signs of glacial action in the Carpathians.—The negative variation is not an infallible sign of nervous activity, by M. A. Herzen.—Cellular embolism, by MM. Charrin and Levaditi.—On a case of endothelioma of bone, by M. Paul Berger.

DIARY OF SOCIETIES.

THURSDAY, DECEMBER 7.

ROYAL SOCIETY, at 4.30.—Vapour-density of Bromine at High Temperatures: Dr. E. P. Perman and G. A. S. Atkinson.—Polytremacis and the Ancestry of Helioporidæ: Dr. J. W. Gregory.—Gold Aluminium Alloys: C. T. Heycock, F.R.S., and F. H. Neville, F.R.S.—On the Association of Attributes in Statistics; with Examples from the Material of the Childhood Society, &c.: G. U. Yule.—Data for the Problem of Evolution in Man. III. On the Magnitude of certain Coefficients of Correlation in Man, &c.: Prof. Karl Pearson, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Cost of Steam Raising: John Holliday.—Influence of Cheap Fuels on the Cost of Electrical Energy: R. E. Crompton. (Adjourned Discussion.)

LINNEAN SOCIETY, at 8.—On some Vegetable Poisons used for the Capture of Fish by the Australian Aborigines: J. W. Fawcett.—On some New Zealand Schizopoda: G. M. Thomson.—On the Structure of Porites: H. M. Bernard.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—The Oxidation of certain Organic Acids in presence of Iron: H. J. H. Fenton, F.R.S., and H. O. Jones.—The Determination of the Constitution of Fatty Acids, Part II.: Dr. A. W. Crossley and H. R. Le Sueur.—On Sulphates of the Form R'_2SO_4, $2M''SO_4$, especially those of Isometric Crystallisation: F. R. Mallet.

RÖNTGEN SOCIETY, at 8.—Observations on Practical X-Ray Work, with Exhibition of Apparatus and Stereoscopic Skiagrams: Mackenzie Davidson.—Bullet in the Brain: J. Moore.

FRIDAY, DECEMBER 8

PHYSICAL SOCIETY (City and Guilds' Technical College, Leonard Street, Finsbury), at 5.—Cylindrical Lenses: Prof. Silvanus Thompson, F.R.S.—Exact Formulæ for Lenses: T. H. Blakesley.—On an Organic Compound of Great Double-Refraction: Prof. Silvanus Thompson, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 8.—Note on the Values of the Coefficients of the Terms of the Third Order in the Lunar Theory: E. W. Brown.—Observations of the Leonids at the University Observatory, Oxford: H. H. Turner.—On the Proper Motions of Berlin B. 5072 and 5073: F. A. Bellamy.—New Nebulæ discovered Photographically with the Crossley Reflector of the Lick Observatory: J. E. Keeler.—Observations of the Leonids: Durham Observatory.—On the Relation between Magnetic Disturbance and the Period of Solar Spot Frequency: W. Ellis.—The Extra-Equatorial Currents of Jupiter in 1899: Rev. T. E. R. Phillips.

MALACOLOGICAL SOCIETY, at 8.—On the Anatomy of *Hemiplecta Floweri*, Smith, from Perak, with Notes on some other Eastern Genera: Lieut.-Colonel H. H. Godwin-Austen.—(1) Note on *Ampullaria Brohardi*, Granger; (2) Description of a New Species of *Leptopoma* from Borneo: E. A Smith.—Note on the Anatomy of *Zonites Rollei*, Kobelt: W. E. Collinge.—On some Recent Conchological Discoveries in Victoria: Mrs. A. F. Kenyon.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—A Continuous Mean-Pressure Indicator for Steam-Engines: Prof. William Ripper.

MONDAY, DECEMBER 11.

SOCIETY OF ARTS, at 8.—Art Enamelling upon Metals: H. H. Cunynghame.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—A Journey through Abyssinia to the Nile: H. Weld Blundell.

TUESDAY, DECEMBER 12.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Combined Refuse-destructors and Power-plants: C. Newton Russell.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—Survival in Primitive Rites of the Disposal of the Dead, with special reference to India: Wm. Crooke.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—(1) Notes on the Use of the Dallmeyer Focometer; (2) The Origination of Printing Types by Photographic Methods: T. Bolas.

WEDNESDAY, DECEMBER 13.

SOCIETY OF ARTS, at 8.—Sea Angling and Legislation: F. G. Aflalo.

THURSDAY, DECEMBER 14.

ROYAL SOCIETY, at 4.30.

SOCIETY OF ARTS, at 4.30.—Round about the Andamans and Nicobars: Colonel R. C. Temple.

MATHEMATICAL SOCIETY, at 8.—Sums of Greatest Integers: G. B. Mathews, F.R.S.—Note on Circular Cubics: A. B. Basset, F.R.S.—Formulæ involving Central Differences; and their Application to the Calculation and Extension of Mathematical Tables: W. F. Sheppard.—On the Expression of Spherical Harmonics as Fractional Differential Coefficients: J. Rose-Innes.—The Genesis of the Double Gamma Functions: E. D. Barnes.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Discussion on Mr. Crompton's and Mr. John Holloway's Papers.—Electrical Time Service: F. Hope-Jones.

FRIDAY, DECEMBER 15.

EPIDEMIOLOGICAL SOCIETY, at 8.30.

INSTITUTION OF CIVIL ENGINEERS, at 8.—On Sludge: Blamey Stevens.

CONTENTS.

PAGE
Lyon Playfair's Life. By **H. E. R.** 122
The Gold-Fields of Alaska. By **G. W. L.** 122
A New Text-Book on Chemistry. By **W. A. S.** . . 125

Our Book Shelf:—

Earl: "Elements of Natural Philosophy" 125
Cooper: "Elementary Practical Chemistry" 126
Reynolds: "The Teaching of Geography in Switzerland and North Italy" 126
Herdman: "Liverpool Marine Biology Committee's Memoirs. I. Ascidia" 126
Muir: "The Story of the Wanderings of Atoms, especially those of Carbon" 126
Ormerod: "General Index, by Robert Newstead, F.E.S., Curator of the Grosvenor Museum, Chester, to Annual Reports of Observations of Injurious Insects, 1877–1898."—**W. F. K.** 126
Sharpe: "A Hand-List of the Genera and Species of Birds" 126
Physicist: "Human Nature: its Principles and the Principles of Physiognomy" 127

Letters to the Editor:—

The Cause of the Darjeeling Landslips.—**T. H. Holland** 127
Barisal Guns.—**Henry S. Schurr** 127
Butterfly Shadows.—**Commander D. Wilson-Barker** 128
A Canadian Lake of Subterranean Inflow.—**Andrew T. Drummond** 128
Cause of Recent Sunset Colours.—**Horace Darwin**. 128
Substitute for Gas in Laboratories.—**William Gannon** 128
The Methods of Inorganic Evolution. By **Sir Norman Lockyer, K.C.B., F.R.S.** 129
Testimonial to Major-General Sir J. F. D. Donnelly, K.C.B. 132
The November Meteors. By **Dr. W. J. S. Lockyer** 132
Ferdinand Tiemann 133
Notes. (*Illustrated.*) 134

Our Astronomical Column:—

Astronomical Occurrences in December 137
Mercury and Jupiter as Morning Stars 137
Holmes' Comet (1899 *d*) 137
Comet Giacobini (1899 *e*) 137
Spectrum of P Cygni 137
Anniversary Meeting of the Royal Society 137
Stereochemistry and Physiology 140
University and Educational Intelligence 141
Societies and Academies 142
Diary of Societies 144